

## CLAIMS

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1. A filter for tobacco smoke inhaling/generating/producing device, the said filter comprising three sections placed longitudinally one after another wherein,  
5 the first section comprising cellulose acetate fibre acting as a **mouth piece**, the second section comprising activated charcoal selected from group consisting of charcoal particles having grain size ranging between 25 mesh and 100 mesh for effectively reducing p-benzosemiquinone, a highly reactive major harmful oxidant from the mainstream of cigarette smoke and the third section  
10 comprising cellulose acetate fibre located closer to the tobacco portion of the cigarette also acting as a **barrier** between the activated charcoal and tobacco.
  2. The filter as claimed in claim 1, wherein length of the first section is in the range of 10 to 14 mm.
  3. The filter as claimed in claim 1, wherein length of the second section is  
15 dependent on the grain size and/or amount of charcoal used.
  4. The filter as claimed in claim 1, wherein length of the second section is in the range of 4.5 mm to 35mm consisting of one or more activated charcoal particles.
  5. The filter as claimed in claim 1, wherein the length of the third section is in the  
20 range of 2 to 3 mm.
  6. The filter as claimed in claim 1, wherein all the three sections are linearly joined together in succession using a thin wall tube made of light material selected from the group consisting of thin wall plastic tube, paper, plastic wrapped paper and aluminum foil.
  - 25 7. The filter as claimed in claim 1, wherein the activated charcoal filter consisting of charcoal granules which, are placed in a void space between the sections of cellulose acetate filters namely the mouthpiece and the barrier.
  8. The filter as claimed in claim 1, wherein the amount of charcoal used is in the range between **0.1g and 0.6g**.
  - 30 9. The filter as claimed in claim 1, wherein each charcoal bed of length  $5.0 \pm 0.5$  mm is packed with 0.1 g of charcoal granules.

10. The filter as claimed in claim 1, wherein the activated charcoal used is selected from group consisting of charcoal particles with grain size ranging between 25 mesh and 100 mesh.

5 11. The filter as claimed in claim 1, wherein the activated charcoal used is selected from the group consisting of BS 25/44, BS 44/52, BS 52/60, BS 60/72, 72/85 and 85/100 for effectively reducing p-BSQ from the mainstream smoke.

12. The filter as claimed in claim 1, consisting of 0.2 g of activated charcoal of the grain size BS (British standard mesh) 44/52.

10 13. The filter as claimed in claim 1, consisting of 0.4 g of activated charcoal of the grain size BS 44.

14. The filter as claimed in claim 1, consisting of 0.2 g of activated charcoal of the grain size BS 52/60.

15. The filter as claimed in claim 1, consisting of 0.3 g of activated charcoal of the grain size BS 52/60.

15 16. The filter as claimed in claim 1, consisting of 0.15 g of activated charcoal of the grain size BS 60/72.

17. The filter as claimed in claim 1, consisting of 0.2 g of activated charcoal of the grain size BS 60/72.

20 18. The filter as claimed in claim 1, consisting of 0.1 g of activated charcoal of the grain size BS 72/85.

19. The filter as claimed in claim 1, consisting of 0.15 g of activated charcoal of the grain size BS 72/85.

20. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.4 g of BS 44 and 0.2 g of BS 52.

25 21. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.2 g of BS 44/52 and 0.1 g of BS 52/60.

22. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.2 g of BS 44/52 and 0.1 g of BS 60/72.

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23. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.1 g of BS 44/52 and 0.1 g of BS 72/85.
24. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.2 g of BS 44/52 and 0.1 g of BS 72/85.
- 5 25. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.15 g of BS 44/52 and 0.1 g of BS 72/85.
26. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.1 g of BS 52/60 and 0.1 g of BS 60/72.
27. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.1 g of BS 52/60 and 0.1 g of BS 72/85.
- 10 28. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.1 g of BS 60/72 and 0.1 g of BS 72/85.
29. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.1 g of 52/60 and 0.05 g of BS 72/85.
- 15 30. The filter as claimed in claim 1, wherein the activated charcoal mixture used consists of 0.1 g of BS 60/72 and 0.05 g of BS 72/85.
31. The filter as claimed in claim 1, wherein said filter inhibits p-benzosemiquinone (p-BSQ) of the mainstream smoke up to 85 percent.
32. The filter as claimed in claim 1, wherein the said filter inhibits the protein oxidation, as evidenced by carbonyl formation in BSA by the mainstream cigarette smoke solution up to 89 percent.
- 20 33. The filter as claimed in claim 1, said filter reduces nitric oxide (NO) of the mainstream smoke up to 68 percent.
34. The filter as claimed in claim 1, wherein the nicotine delivery in the mainstream smoke is reduced from 935 µg to 350-400 µg in a cigarette.
- 25 35. The filter as claimed in claim 1, wherein use of nicotine fortified tobacco results in increased delivery of nicotine without increasing the level of p-BSQ.
36. The filter as claimed in claim 35, wherein tobacco fortified with 2 to 4 mg of nicotine increases the nicotine delivery without increasing the level of p-BSQ.

37. The filter as claimed in claim 35, wherein tobacco fortified with 2 to 4 mg of nicotine increases the nicotine delivery in the main stream smoke from 350-400 µg to 575-700 µg without increasing the level of p-BSQ.
38. The filter as claimed in claim 35, wherein nicotine fortified tobacco with 2 to 4 mg of nicotine, delivers nicotine up to 90% without increasing the level of p-BSQ.
39. The filter as claimed in claim 1, wherein the mainstream smoke solution is incapable of producing significant oxidative damage to guinea pig lung microsomal proteins *in vitro*.
40. A tobacco smoking device comprising a tobacco unit and a filter unit, said tobacco unit filled with tobacco particles and said filter unit comprising three sections placed longitudinally one after another wherein, the first section comprising cellulose acetate fibre acting as a mouth piece, the second section comprising activated charcoal and the third section comprising cellulose acetate fibre located abutting the tobacco portion of the cigarette this acting as a barrier between the activated charcoal and tobacco.
41. The device as claimed in claim 40, wherein the said filter comprising stipulated amounts of charcoal particles having grain size ranging from 25 mesh to 100 mesh which is proportionate to the length of the cigarette.
42. The device as claimed in claim 40, wherein the said filter comprising stipulated amounts of charcoal particles having sizes ranging from 25 mesh to 100 mesh which is proportionate to the level of *p*-benzosemiquinone (*p*-BSQ) a highly reactive major harmful oxidant, for effectively reducing its level from the mainstream cigarette smoke while providing comfortable mouthful of smoke and nicotine delivery.
43. A smoking device as claimed in claim 40 is used in smoking devices selected from group consisting of cigarette, cigar holders, pipes and any other smoking devices.
44. A smoking device as claimed in claim 40 comprising activated charcoal for reducing p-BSQ of the mainstream tobacco smoke, wherein the said filter element is incorporated into a filter of tobacco smoking device such as a

cigarette, cigar, pipe or in a separate filter through which tobacco smoke passes before the process of inhaling.

45. The smoking device as claimed in claim 40, wherein p-BSQ of the mainstream tobacco smoke is reduced significantly.

5 46. ~~The filter as claimed in claims 1 and 40, wherein the smoke from charcoal filter~~  
cigarettes exhaled by smokers containing markedly low level of p-BSQ and is  
potentially less hazardous to passive smokers.

47. The cigarette filter of claims 1 to 40 wherein the mainstream smoke solution is  
incapable of producing significant oxidative damage to guinea pig lung  
microsomal proteins *in vitro*.

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48. The filter of claims 1 to 40 comprising activated charcoal wherein the  
mainstream cigarette smoke containing very low level of p-BSQ is incapable of  
producing significant oxidative damage to the lung microsomal proteins of  
guinea pigs when the animals are exposed to smoke emitted from the said  
charcoal - filtered cigarettes in contrast to marked damage of the lung tissue  
when the animal are exposed to smoke from cigarettes without having the said  
charcoal filter.

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